INVESTIGATION OF FURBEARER OCCURRENCE IN NORTH DAKOTA WITH SPECIAL REFERENCE TO SWIFT FOX, 1999

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ABSTRACT

Sections were selected randomly and optimal quarter-sections within those sections were selected on site for survey (n=40). Furbearer occurrence was determined by identifying tracks to species. Presence of red fox, coyote, striped skunk, and raccoon were determined. No swift fox were detected. Differential reporting rates for red fox and coyote harvests and confirmed swift fox observations indicate swift fox exist at extremely low densities if at all in North Dakota. An additional 15 quarter sections and 18 adjacent non-paved public thoroughfares were selected and examined for furbearer occurrence by species. No difference in occurrence ($P > 0.05$) of occurrence by species was detected in quarter-sections compared to roadsides. A major epizootic of sarcoptic mange is dramatically affecting canid densities and distribution in North Dakota wspecially in the eastern and northern portions of the state.

INTRODUCTION

Interest in swift fox (Vulpes velox) has increased greatly in recent years. Swift fox were common in North Dakota during pre-settlement times (Bailey 1926, Thwaites 1953); however, the species became very rare about 1880-1900 (Bailey 1926). Swift fox are known to be very rare in North Dakota; however, data are being collected annually with which to make inference concerning the occurrence of the species. Initially southwestern North Dakota has been selected for study, because of occasional reports of possible swift fox in these areas. . The objective of this report is to present the results of a survey to determine relative occurrence of all furbearer species in this area with special reference to swift fox .

STUDY AREA AND METHODS

Surveys were conducted in southwestern North Dakota in 1999. This area is primarily semi-arid prairie grassland with some intermixed cropland and hayland. Topography is generally rolling grassland to rough broken badlands; native hardwoods trees and shrubs occur in the many of the deeper coulees. Climate in North Dakota is typical of sub-arctic continental interiors with hot summers and cold winters.

Track surveys were conducted to determine relative occurrence of furbearers in each quarter section surveyed. The survey was modified from one developed by Sargeant et al. (1993). Timing of the survey minimizes errors in correctly identifying species caused by

movement of young, especially in the canids.

Sections were selected randomly for study; within each section one quarter-section study area was selected at the site which had the best potential for identifying furbearer tracks. Some randomly selected sections had to be relocated to improve field logistics due to remoteness and inaccessibility of some of the original selections or proximity to human habitations. All study areas were surveyed no sooner than 48 hours after a rain. The search pattern consisted of visiting as many locations on each study area as possible on foot within 30 minutes that had potential to reveal furbearer tracks.

Data collected for each quarter-section visited consisted of relative abundance of tracks identified by species (none, scarce, common, abundant), predominant cover type (pasture, hayland, cropland, marsh, idle), relative amount of available track sites (many, moderate, few, almost none), relative soil condition for holding tracks (excellent, good, fair, poor), and the track accumulation period (1 day, 2-3 days, 4-6 days, 7 or more days). Coyote and red fox tracks were distinguished based on size (Allen, unpubl. data). Swift fox tracks are easily distinguished from other canids, because they average about 10 mm shorter than the smallest red fox tracks (Orloff et al., 1993). Data analysis consisted of the examining the number of study areas with furbearer track occurrence by species.

Quarter-sections were selected and examined as above for furbearer tracks to a sample from the nearest public access roadside to that quarter-section for furbearer tracks. No paved roads were included in this testing. Search pattern consisted in examining each sample type for 30 minutes for furbearer tracks. Tracks were identified to species when possible. Differences in numbers of quarter-sections with furbearer tracks were compared to roadsides with furbearer tracks by species with Chi-square.

Population changes are being monitored by spring surveys and computer population modeling. The spread and occurrence of sarcoptic mange is being monitored with data collected from USDA-ADC personnel.

RESULTS

Densities of furbearer species were not determined in this study. Relative occurrence of furbearer species identified on the 44 study areas in 1999 (Table 1) consisted of coyotes (Canis latrans-14x areas), red fox (Vulpes vulpes-20 areas), badger (Taxidea taxus) -1 area, raccoon (Procyon lotor-8 areas) and skunk (Mephitis mephitis-1 area) . No swift fox tracks were identified on any of the 44 study areas. No visual observation of any furbearer was made on any study area. Twenty-six of the 44 study areas contained tracks of at least 1 furbearer species.

Since 1997 no differences have been found in furbearer occurrence on 15 quarter-sections compared to 18 corresponding roadsides for red fox ($X^2=0.689$, df=1, $P=0.407$) for coyotes

(X2=2.20, df=1, P=0.138) for raccoons (X2=0.061, df-1, P=0.805), or for skunks (X2=0.005, df=1, P=0.943).

Other relative occurrence data for canids are also available in North Dakota. Since 1970 we have obtained 4 confirmed observations of swift fox in North Dakota. During that same time period there have been 701,751 red fox and 213,609 coyotes sold to North Dakota furbuyers.

Red foxes and coyotes in north-central and eastern North Dakota have been strongly impacted by sarcoptic mange. Population size of coyotes are about ½ and red foxes about a of what they were in 1992.

DISCUSSION

Interspecific competition has been well documented between wolves (Canis lupus) and coyotes (Carbyn 1982) and between coyotes and red foxes (Sargeant et al., 1987) in the northern plains. Interspecific competition from other canids (especially coyotes) may be a significant limiting factor in currently existing swift fox populations in Kansas (L. Fox, 1994 Midwest Furbearer Workshop), and in efforts at reintroduction of swift fox in Saskatchewan (L. Carbyn, 1994 Midwest Furbearer Workshop). Ralls and White (1995) noted that although coyote predation on kit fox in California can be severe, they found indications that red fox predation on kit fox may be catastrophic to the population. Data collected in this study indicate that many quarter-section study areas selected in North Dakota probably have red fox or coyotes or both species present. Track surveys should represent a minimum distribution, because some quarter-sections with no canid tracks observed likely had canids present. Conditions for observing tracks in North Dakota are often far from perfect; however, a few good sites in most quarter sections are all that is often needed to identify one or more species of furbearer present. Considering the hypothesis the observations of Ralls and White (1995) suggest and the density and distribution of red fox and coyotes in North Dakota, the potential for viable swift fox populations may be quite remote. This hypothesis certainly warrants further investigation.

Historically, interspecific competition may not have been as severe on swift fox prior to settlement in the region. At that time wolves were the dominant canid, and coyotes were probably very rare (Johnson and Sargeant 1977). With removal of wolves during and after settlement the canid composition changed and coyotes became more abundant, and conditions for swift fox survival may have deteriorated dramatically. If this hypothesis is correct, the probability for existence of viable natural or reintroduced swift fox populations in this area is extremely limited without major alterations to the present canid community. Alteration of the current canid community to include wolves is not a viable management option in an agricultural environment due to conflicts with livestock. Alteration of the canid community to physically remove the coyotes or red fox is not a viable management option due to prohibitive costs of neutralizing canid dispersal into the control area (Allen, unpubl. data).

Numbers of red fox and coyotes sold to North Dakota furbuyers is the minimum number of these species taken, annually. Not all animals are sold after they are taken, and not all pelts sold are sold to North Dakota furbuyers. Given the magnitude of differences of red fox and coyotes taken as compared to confirmed swift fox observations, we again question if swift fox have very much potential for survival in North Dakota considering the number and distribution of these other canids at present.

The present study also illustrates the paucity of data that is obtained from diurnal observations of live furbearers. Few are seen because of the secretive behavior of these species; however, most randomly selected quarter-section study areas with favorable conditions for locating tracks had furbearer tracks present indicating occurrence of one or more species. In the case of swift fox; however, a visual observation would be required in addition to a track observation to confirm their occurrence, and to eliminate any possible error caused by misidentification of a red fox or coyote pup track. This experimental investigation indicates that various species of furbearers occur on almost all quarter-section study areas, and occurrence of coyotes or red fox or both species is likely on may areas. Other species such as swift fox may be present, but they appear to exist at extremely low levels.

At this point it looks feasible to search public thoroughfare roadsides for tracks of furbearer species and ascertain reliable data on species composition and distribution similar to what would be found on quarter-sections or some other parcel of real estate. This would allow states with problems of access to distribution along public thoroughfares without receiving unnecessary abuse from local private landowners. However, more data needs to be gathered from North Dakota and probably several other locations to reliably determine the potential for this method.

Reintroduction is periodically discussed as an option to expanding distribution into once occupied ranges to augment natural dispersal. Earlier data (Sargeant et al., 1975) shows that red fox have the capacity to change territory size commensurate with densities. Thus, with the lower red fox densities currently present in North Dakota, formerly occupied ranges are still likely completely occupied. Similar, but somewhat more circumstantial, data also exists for coyotes (Andelt 1985). Given this and the current sarcoptic mange epizootic it make little sense to reintroduce swift foxes into areas where 2 major potential mortality agents are present. Subjective cost:benefit analysis indicates the potential for success is virtually non-existent, and the money will be gone.

We identify several research needs for swift fox. We hypothesize that most survey procedures for swift fox that require a behavioral response on the part of the animal to detect this presence in an area will be shown to underestimate distributions compared to control data. This occurs because of shyness behavior in canids especially to foreign objects, lures and placed baits. The potential bias is this: if a lure (e.g. some type of bait, etc.) or object (e.g. live trap or track plate, etc.) is placed in the field and the observer does not detect the animals presence from it,

does that mean the animal is not present? The answer is obviously no. In effect, then, the investigator has actually measured the response rate of the animal to the lure or object, and not necessarily the presence of the animal in the area. In addition, sample sizes are restricted, because each sample site requires 2 or more visits by the investigator to collect data effectively multiplying the man-days needed to collect data by the number of visits.

We encounter some problems with track surveys as well, because we do not always detect tracks of a species even though that species is present, and there is potential for error in correctly identifying tracks to species if inexperienced observers are used. The advantage of track surveys is that nothing special is done that requires a behavioral response on the part of the animal to detect his presence; thus, the potential for behavioral bias in the data on the part of the animal is absent. In addition, sample sizes are maximized, because the investigator only needs to visit a sample site once to obtain the desired data. We suspect that all surveys will show swift fox distributions smaller than the true distribution. However, because behavioral bias is lacking, we suspect track surveys will consistently show larger swift fox distributions with the least bias in the data.

We suggest that determining a standardized survey method that eliminates behavioral bias that can be used by all states to determine maximum distribution of swift fox should receive high priority by the SFCT. This is needed in order to make reliable comparisons of maximum distribution, and to interpret differences in distributions over broad physiographic regions or jurisdictions.

We also suggest that geneticists need to demonstrate definitively if swift fox and kit fox are separate species or merely variations of the same species living in different areas. If the 2 species are separate the case for additional research is very strong. If, however, they are the same species the data base for management increases dramatically with inclusion of all the kit fox data, and the case for endangered species classification in any form becomes very weak with inclusion of several other widely spaced life zones in the species distribution.

The most pressing research need for North Dakota is identifying the role of canid interspecific competition on swift fox. If this behavior is as strong as expected for canids in general and red fox in particular, the potential for a future population of swift fox in North Dakota is remote at best. Other data we will need to have determined from areas that have viable populations are detailed information on reproductive performance (litter sizes) by female age class, population age structure at some point during the year, and annual survival rates by age class group and sex.

Table 1. Number and percent occurrence of furbearer tracks by species and county on randomly selected study sites in southwestern North Dakota - 1999

Species	County and number (%) of quarter-sections with tracks found			
	Bowman (n=20)	Slope (n=18)	Golden Valley (n=2)	Total (n=40)
Red Fox	5 (25.0)	1 (5.6)	2 (100.0)	8 (20.0)
Coyotes	8 (40.0)	7 (38.9)	0	15 (37.5)
Striped Skunk	1 (5.0)	0	1 (50.0)	2 (5.0)
Badger	2 (10.0)	0	0	2 (5.0)
Raccoon	3 (15.0)	5 (27.8)	1 (50.0)	9 (22.5)

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